

A Case Report of Intrauterine Device Migration: Uterine Penetration and Bladder Involvement with Secondary Stones 3 Years Post-Insertion

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Background: Intrauterine devices (IUDs) are among the most popular contraceptive methods globally due to their convenience and cost-effectiveness. However, improper placement can lead to complications such as device migration and uterine perforation, with increased risk observed when IUDs are implanted within four to six weeks postpartum. Typically, patients are asymptomatic or experience mild lower abdominal discomfort or minor abnormal vaginal bleeding following IUD displacement. Advances in diagnostic techniques have resulted in an increased reporting of uterine perforations due to IUD migration. Although rare, secondary stone formation following IUD perforation has been noted. In 2023, cases of IUD perforation were reported in women with a history of multiple cesarean sections and in a young woman without detailed marital history.

Prior Presentation: The 43-year-old patient, who had an IUD inserted three years prior, exhibited symptoms of frequent urination and painful urination unrelieved by anti-infective and analgesic treatments. The patient underwent cystotomy for foreign body removal, which revealed the IUD had perforated the uterus and bladder, with both arms of the device invaded into bladder wall and covered with concentric stone layers. Complete removal of the IUD and surrounding stones, followed by suturing and post-operative anti-infection analgesic treatment, led to significant symptom improvement.

Conclusion: This case underscores the importance of regular IUD check-ups to prevent uterine perforation and the necessity of considering IUD migration in patients presenting with lower urinary tract symptoms without routine IUD examination. While self-examination by the patient through the strings in the vagina is possible, imaging studies are also indispensable. Surgery has proven to be an effective solution for such complications, but cystoscopy is not always the best option, and the decision to perform open surgery should be based on the patient's perforation and the condition of the surrounding tissues. This paper emphasizes the need for vigilance and proper clinical management.

Keywords: IUD, migration, bladder stone, cystoscopy, computed tomography

Introduction

IUD is widely used around the world, the rates of IUD insertion vary by region, with over 80% of global intrauterine IUD users residing in Asia, and nearly two-thirds (64%) of them living in China.¹ IUD perforation is a complication that warrants attention, and its occurrence is related to the material of the IUD, the timing of pregnancy, and the state of insertion.

The most common complication of IUD perforation is adhesion to the greater omentum, which can lead to small intestinal obstruction;² moreover, IUD migration into the Pelvis cavity is a rare but serious occurrence, with an incidence rate of 1%,³ and cases involving migration into the bladder with secondary stone. The surface of displaced IUD is more likely to form stones and induce urinary system symptoms such as bladder irritation. Empirical anti-infective therapy is not effective for these patients, but surgery is an effective solution. Here, we present a case of IUD insertion in a normal uterus more than one month postpartum, complicated by migration and stone formation.

Case Presentation

A 43-year-old woman, who had no inducing factors of frequent urination and painful urination for 1 week, had no obvious relief after anti-infective treatment, so she came to our department for further remedy. She had normal menstruation, often accompanied by lower abdominal discomfort in the premenstrual period. The patient gave birth to a child three years ago and subsequently underwent an IUD implant procedure with a copper IUD, which was performed more than a month after the birth. After the insertion, she experienced more severe menstrual cramps than usual, but did not seek medical attention.

During the treatment in our hospital, her vital signs were stable and her physical examination showed nothing wrong. Urinalysis showed WBC (-). Blood test showed CRP:6.3 mg/l, GFR:112 mL/min, Scr:82 μ mol/L. Pelvic ultrasound suggested the possibility of a foreign body in the posterior wall of the bladder. Because the ultrasound imaging of IUD is affected by the composition and migrated orientation of IUD.⁴ We further performed CT imaging of the urinary system, CT showed that a T-shaped hyperdense shadow could be seen in the bladder cavity, with a length diameter of about 5 cm and a width of about 0.7 cm (shown in Figure 1). Therefore, cystoscopy was performed and the presence of a tubular foreign body on the mucosal surface of the posterior wall of the bladder base was confirmed.

Due to the adhesion of the IUD to the muscular layer, pharmacological interventions are unlikely to resolve the underlying issue, and cystoscopic treatment is impeded by the obstructed view caused by the IUD's tilt. Consequently, the patient elected to undergo a cystotomy for the removal of the foreign body. During the operation, it was found that the uterus and bladder were adherent and the foreign body penetrated through them. Both arms of the Mu-IUD invaded the bladder wall, the surface was wrapped with stones, and the surrounding tissue was not necrotic. (shown in Figure 2)

We carefully dissociated the bladder and the space around the uterus, completely removed the foreign body, and then sutured the uterus and the bladder with 2-0 absorbable sutures, and gave anti-infection treatment after operation. After the IUD was removed, it was seen that the stone edge on the surface of the IUD was concentrically layered, which was consistent with the characteristics of secondary stones. After 6 months of follow-up, the patient said that the symptoms of frequent urination and painful urination improved significantly.



Figure 1 The CT scan displays a strip-like high-density shadow within the bladder on different planes, with a width of approximately 0.7 cm and a length of about 5 cm.

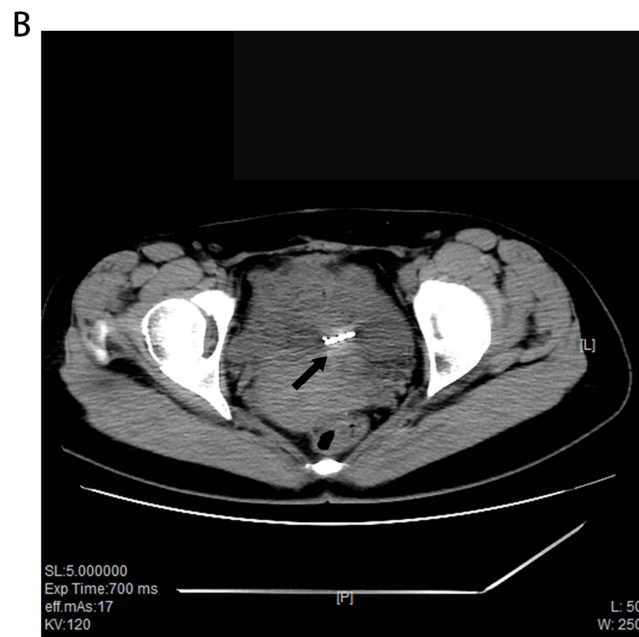


Figure 2 Cystoscopic visualization of a tubular foreign body coated with white crystal.

Discussion

IUD has become one of the most popular contraceptive methods in the world because of its convenience and low cost.⁵ However, IUD migration often results from improper placement, which can lead to serious complications such as contraceptive failure and even perforation.

The risk of uterine perforation is elevated among women who have an IUD implanted between four days and six weeks postpartum, compared to women who have an IUD implanted during non-postpartum periods.⁴ Patients are usually asymptomatic or experience only mild lower abdominal discomfort or mild abnormal vaginal bleeding within a few days after migration.⁶ The improvement in diagnostic techniques has led to an increase in the number of reports of uterine perforation secondary to IUD displacement in recent years. However, the occurrence of secondary stones in combination is still rare. In 2023, AkbarNovan et al reported a case of uterine perforation of the IUD secondary to stones in a woman with a history of multiple caesarean sections, in a woman with a history of multiple caesarean sections. Her risk factors included previous caesarean sections and endometrial curettage.⁷ Jaisukh Kalathia et al also reported a case of migrated IUD with secondary stone formation in a young woman, where no details of her marital history were provided.⁸ Compared to other cases, this paper presents a case of an Asian woman who may have induced perforation and concomitant stone formation three years after having an IUD inserted at an inappropriate time postpartum, emphasizing the importance of timing and follow-up for IUD insertion.

Uterine perforation caused by IUD is one of the most serious complications, with an incidence of less than 1%,³ and perforation to the bladder with stones is even rarer. The mechanism that causes IUD perforation is not well understood, heavy menstrual bleeding,⁹ and mispositioned uterus (ie Anteverted or retroverted)¹⁰ may be major risk factors. Researchers have suggested that the ideal position of the primary ring should be near the fundus of the uterus, and inappropriate placement may cause IUD to penetrate into the endometrium or even muscle layer, causing uterine perforation.¹⁰ After menopause, ovarian function declines and the uterus gradually atrophies without the support of sex hormones, at which time asymmetrical myometria pushes the IUD into an abnormal position. A study has demonstrated that particular larger-sized MLCu devices are vulnerable to deformation when subjected to asymmetric multi-vector uterine pressure, which can result in the displacement of the IUD.¹¹ One-dimensional frameless IUD has the characteristics of small size and no transverse arm, which avoids the over-high local pressure of the transverse arm invading the mucosa when the uterine cavity is deformed. It is an ideal alternative treatment method for insertion IUD.

Clinically, simple IUD perforation may have no obvious symptoms,¹² but secondary bladder stones will stimulate the mucosa and produce bladder irritation. In addition, large oval stones may occasionally block the bladder outlet and cause sudden interruption of urine in patients, while stones formed on the surface of IUD are less mobile and do not occur this situation. In terms of risk factors, bladder stones tend to occur in elderly men with urinary tract obstruction, often accompanied by repeated urinary tract infections. In the present case, the urine routine of the female patient showed leucocytes (-), which suggests that stone formation is not strongly associated with infection.

Early abnormalities in the position of the IUD can be avoided by adjusting or removing it to avoid perforation, and early displacement can be detected by regular follow-up and imaging.¹³ Pelvic ultrasound is an effective method to detect IUD displacement. About 85% of early IUD intrauterine displacement has no obvious clinical symptoms.⁶ Therefore, once signs of IUD encroachment on the endometrium are found, it should be removed immediately to avoid perforation. However, in the absence of imaging diagnosis, transvaginal pulling of the IUD line to try to remove the embedded or even perforated IUD is likely to aggravate the established damage.

Depending on the condition of IUD perforation, there are several clinical treatments. For patients with light adhesion, cystoscopic removal of ectopic IUD and stones is the preferred treatment,¹⁴ and transurethral electrocystotomy to remove IUD has also been reported in some literature. In this case, the patient had serious adhesion between bladder and uterus and low maneuverability under minimally invasive visual field. Therefore, cystotomy for foreign body removal was chosen because of its greater controllability and safety, which could avoid the occurrence of postoperative bladder perforation caused by electrocystotomy.¹⁵

For patients with an IUD placement and a history of pregnancy who have urinary symptoms, the possibility of perforation and migration of the IUD into the bladder needs to be considered of the IUD into the bladder must be vigilant. Women who have an IUD placed should be followed up regularly to prevent latent uterine perforation.

According to gynaecologists' advice, the first simple method for monitoring an IUD is for women to regularly check for the strings attached to the IUD in the vagina. If vaginal checks are conducted regularly and any missing strings are reported promptly, most cases of IUD migration can be prevented. On this basis, follow-ups should also pay attention to whether women experience worsening dysmenorrhea, abnormal bleeding, or other conditions after IUD insertion. Perforated IUDs often do not cause findings on intraperitoneal imaging,¹⁶ hence routine pelvic imaging examinations are necessary. In necessary cases, invasive examinations such as cystoscopy may also be employed. A periodic IUD review can detect a displaced device.¹⁷ For patients who must be treated surgically, recovery should be followed up regularly to determine whether the patient's urinary symptoms have recovered as a result of removal of the displaced IUD and to avoid missing other urinary diseases.

This study has certain limitations: First, as reporters of the case, we lack the experience of obstetricians, which may have narrowed our reporting perspective. Second, due to the rarity of stone complications, the factors contributing to stone formation remain uncertain. Although infection is one of the promoting factors for stone formation, no clear signs of infection were found in this case, and more similar cases are needed for reference.

Abbreviations

IUD, Intrauterine devices; WBC, white blood cell; CRP, C-reaction protein; CT, Computed Tomography; BPH, benign prostatic hyperplasia.

Data Sharing Statement

All data generated in the present study are included in the article and figures.

Study Approval Statement

The study was conducted according to the guidelines of the Declaration of Helsinki and approved by the Ethics Committee of Changzhou Wujin People's Hospital, this study did not require ethical approval. This case report is based on a retrospective analysis of clinical data with patient consent, and no institutional approval was required.

Consent to Publish Statement

Written informed consent was obtained from the patient for publication of this case report and any accompanying images.

Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

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Disclosure

The authors have no conflicts of interest to declare.

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